BRUHATH BANGALORE MAHANAGARA PALIKE

BYATARAYANAPURA DIVISION

Name of the work: Comprehensive Development for Roads and Drains in Ward no. 9, 10 and 11 Under CMC and TMC Grants, Vidyaranyapura Sub-Division, Yelahanka Zone, Byatarayanapura Division.

First RA Bill
Test Reports

TEJUS
CONSULTANTS

No. TC / BBMP / BYT PURA DIVISION/ 090 / 17 – 18

Date: 31.1.2018

To

The Executive Engineer

Byatarayanapura Divison

Bruhat Bangalore Mahanagara Palike

Bangalore – 560 092

Dear Sir

Sub: **First RA bill for the work of Comprehensive Development for Roads and Drains in Ward no. 9, 10 and 11 Under CMC and TMC Grants, Vidyaranyapura Sub-Division, Yelahanka Zone, Byatarayanapura Division**

In reference to the above subject, this is to bring to your kind notice that we have scrutinized the **First RA bill** submitted by M/S Ram and Company, Engineers & Contractors. # 10,3rd Floor, Puttaiah Compound, 80 Ft Road, Ashwath Nagar, RMV 2nd Stage Banglore-94, towards the above said work and arrived at an amount of **Rs. 4,54,03,000.85/-(Rupees Four Crore Fifty Four Lakh Three Thousand and Eighty Five Paise Only**). The work has been completed satisfactorily

This is for your kind information.

Thank you and assuring you the best of our Services at all the times

For Tejus Consultants
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31/1/18

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TEJUS CONSULTANTS
No. 58, 3rd main, 6th Cross, 1st Stage KHB Colony, Basaveshwaranagar, Bangalore - 560079, O : +91 80 23287532, tejusconsultants@gmail.com

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Test Report on Cement

Project	COMPREHENSIVE DEVELOPMENT FOR ROADS AND DRAINS IN WARD NO. 9, 10 AND 11 UNDER CMC AND TMC GRANTS, VIDYARANYAPURA SUB-DIVISION, YELAHANKA ZONE, BYATARAYANAPURA DIVISION.
Client	Bruhat Bangalore Mahanagar Palike
Consultant	TEJUS CONSULTANTS
Contractor	M/S Ram and Company, Engineers & Contractors.
Sample ID	Cement
Date of Sample Tested	14/12/17
Sample Supplied By	Agency

Sl.No.	Descriptions	Test Method as per IS	Test Result	Requirements as per IS: 12269-1987
1	a) Initial Setting Time	IS-4031 (Part-5)	37 Minutes	Not Less than 30 Minutes
	b) Final Setting Time	IS-4031 (Part-5)	381 Minutes	Not More than 600 Minutes
2	Soundness	IS-4031 (Part-3) By the Le-Chatelier method	3mm	Not More than 10 mm
3	Standard Consistency	IS-4031 (Part-4)	28.00%	

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TEST REPORT

Clients	Bruhat Bangalore Mahanagara Palike				
Project	COMPREHENSIVE DEVELOPMENT FOR ROADS AND DRAINS IN WARD NO. 9, 10 AND 11 UNDER CMC AND TMC GRANTS, VIDYARANYAPURA SUB-DIVISION, YELAHANKA ZONE, BYATARAYANAPURA DIVISION.				
Consultants	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore				
Contractor	M/S Ram and Company, Engineers & Contractors.				
Total Weight:	10000	gms			

SIEVE ANALYSIS

Type of Material	20 mm down size		**Proposed Use**	**Column Concrete**	
Sample Location	At Plant		**Date of Sampling**	14/12/2017	
			Date of Testing	14/12/2017	
IS Sieve Size	**Weight Retained**	**Cum. Weight Retained**	**Cum. % Retained**	**Cum. % Passing**	**Spec. Limit (%) Passing**
40.00 mm	0	0	0	100	**100**
20.00 mm	268	268	2.68	97.32	**95 - 100**
10.00 mm	4950	5218	52.18	47.82	**25 - 55**
4.75 mm	4352	9570	95.70	4.30	**0 - 10**
Pan	430	10000			

Remarks : Satisfactory / Not Satisfactory

Consultant's Representative

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TEST REPORT

Clients	Bruhat Bangalore Mahanagara Palike				
Project	COMPREHENSIVE DEVELOPMENT FOR ROADS AND DRAINS IN WARD NO. 9, 10 AND 11 UNDER CMC AND TMC GRANTS, VIDYARANYAPURA SUB-DIVISION, YELAHANKA ZONE, BYATARAYANAPURA DIVISION.				
Consultants	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore				
Contractor	M/S Ram and Company, Engineers & Contractors.				
Total Weight:	10000	gms			

SIEVE ANALYSIS

Type of Material	20 mm down size		**Proposed Use**	**Column Concrete**	
Sample Location	At Plant		**Date of Sampling**	14/12/2017	
			Date of Testing	14/12/2017	
IS Sieve Size	**Weight Retained**	**Cum. Weight Retained**	**Cum. % Retained**	**Cum. % Passing**	**Spec. Limit (%) Passing**
40.00 mm	0	0	0	100	**100**
20.00 mm	272	272	2.72	97.28	**95 - 100**
10.00 mm	4825	5097	50.97	49.03	**25 - 55**
4.75 mm	4456	9553	95.53	4.47	**0 - 10**
Pan	447	10000			

Remarks : Satisfactory / Not Satisfactory

Consultant's Representative

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TEST REPORT

Clients	Bruhat Bangalore Mahanagara Palike	
Project	COMPREHENSIVE DEVELOPMENT FOR ROADS AND DRAINS IN WARD NO. 9, 10 AND 11 UNDER CMC AND TMC GRANTS, VIDYARANYAPURA SUB-DIVISION, YELAHANKA ZONE, BYATARAYANAPURA DIVISION.	
Consultants	TEJUS CONSULTANTS	
Contractor	M/S Ram and Company, Engineers & Contractors.	
Total Weight:	10000	gms

SIEVE ANALYSIS

Type of Material	12.5 mm down size		Proposed Use	Column Concrete	
Sample Location	Plant		Date of Sampling	14/12/2017	
			Date of Testing	14/12/2017	
IS Sieve Size (in mm)	Weight Retained	Cum. Weight Retained	Cum. % Retained	Cum. % Passing	Spec. Limit (%) Passing
20.0	0	0	0	100	100
12.5	580	580	5.80	94.20	90-100
10.0	3256	3836	38.36	61.64	40-85
4.75	5321	9157	91.57	8.43	0-10
Pan	843	10000			

Remarks : Satisfactory / Not Satisfactory

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Consultant's Representative

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TEST REPORT

Clients	Bruhat Bangalore Mahanagara Palike	
Project	COMPREHENSIVE DEVELOPMENT FOR ROADS AND DRAINS IN WARD NO. 9, 10 AND 11 UNDER CMC AND TMC GRANTS, VIDYARANYAPURA SUB-DIVISION, YELAHANKA ZONE, BYATARAYANAPURA DIVISION.	
Consultants	TEJUS CONSULTANTS	
Contractor	M/S Ram and Company, Engineers & Contractors.	
Total Weight:	10000	gms

SIEVE ANALYSIS

Type of Material	12.5 mm down size		Proposed Use	Column Concrete	
Sample Location	Plant		Date of Sampling	14/12/2017	
			Date of Testing	14/12/2017	
IS Sieve Size (in mm)	Weight Retained	Cum. Weight Retained	Cum. % Retained	Cum. % Passing	Spec. Limit (%) Passing
20.0	0	0	0	100	100
12.5	585	585	5.85	94.15	90-100
10.0	3358	3943	39.43	60.57	40-85
4.75	5498	9441	94.41	5.59	0-10
Pan	559	10000			

Remarks : Satisfactory / Not Satisfactory

TEJUS CONSULTANTS

Consultant's Representative

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CIVIL XPERTS
ISO 9001:2015
CONSULTANTS & TESTING CENTER

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E-mail : civilexpertsltd@gmail.com
URL : www.civilexperts.in

NABL ACCREDITED AS PER ISO/IEC 17025:2005

Job No.: CECTC/BBMP/QC/2017-18 Date: 14.12.2017

TEST RESULTS OF PHYSICAL PROPERTIES OF REINFORCEMENT STEEL

Client : **Bruhat Bangalore Mahanagar Palike**

Name of Work : COMPREHENSIVE DEVELOPMENT FOR ROADS AND DRAINS IN WARD NO. 9, 10 AND 11 UNDER CMC AND TMC GRANTS, VIDYARANYAPURA SUB-DIVISION, YELAHANKA ZONE, BYATARAYANAPURA DIVISION.

Contractor : M/S Ram and Company, Engineers & Contractors.

Sample Identification : 8mm, 10mm, 12mm, 16mm, 20mm TMT Bars

Technical Reference : IS 1786:2008, IS 1608:2005, IS 1599:1985 (Reaffirmed 2006)

Date of test : 14.12.2017

S.No	Brand	Nominal size (dia in mm)	Mass per metre (kg/metre)	TENSILE STRENGTH		
				0.20 % proof stress/ yield stress ($N/mm^{2)}$	Tensile strength ($N/mm^{2)}$	Elongation, percent on gauge length
1	Fe 500	8	0.395	506	561	16
2	Fe 500	10	0.617	523	575	18
3	Fe 500	12	0.889	558	599	19
4	Fe 500	16	1.580	569	610	20
5	Fe 500	20	2.450	587	635	22

Note:

1. The report shall not be reproduced, except in full, without the written approval of the laboratory.
2. The results indicated above are based on the tests carried out on the samples received in the laboratory.
3. Any Query regarding the report must be reported within 15 days from the date of testing.

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For Civil Experts

Authorised Signature

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Test report on Compressive strength of concrete cubes

Project	COMPREHENSIVE DEVELOPMENT FOR ROADS AND DRAINS IN WARD NO. 9, 10 AND 11 UNDER CMC AND TMC GRANTS, VIDYARANYAPURA SUB-DIVISION, YELAHANKA ZONE, BYATARAYANAPURA DIVISION.
Client	Bruhat Bangalore Mahanagar Palike
Consultant	TEJUS CONSULTANTS
Contractor	M/S Ram and Company, Engineers & Contractors.
Location:	Seniour Citizen Building, Vidyaranyapura
Grade of concrete:	M25 (column)
Size of cube:	150x150x150 mm
Reference IS code:	IS:516-1959

Sl.No.	Date of Casting	Date of testing	Age of Test	Weight of Cube	Area of Cube	Failure load	Compressive strength	Avg. Compressive strength
				Kg	mm^2	KN	N/mm^2	N/mm^2
1	16/12/17	23/12/17	7 days	8.818	22500	382	16.98	17.05
2	16/12/17	23/12/17	7 days	8.912	22500	389	17.29	
3	16/12/17	23/1217	7 days	8.568	22500	380	16.89	

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Test report on Compressive strength of concrete cubes

Project	COMPREHENSIVE DEVELOPMENT FOR ROADS AND DRAINS IN WARD NO. 9, 10 AND 11 UNDER CMC AND TMC GRANTS, VIDYARANYAPURA SUB-DIVISION, YELAHANKA ZONE, BYATARAYANAPURA DIVISION.
Client	Bruhat Bangalore Mahanagar Palike
Consultant	TEJUS CONSULTANTS
Contractor	M/S Ram and Company, Engineers & Contractors.
Location:	Seniour Citizen Building, Vidyaranyapura
Grade of concrete:	M25 (Column)
Size of cube:	150x150x150 mm
Reference IS code:	IS:516-1959

Sl.No.	Date of Casting	Date of testing	Age of Test	Weight of Cube	Area of Cube	Failure load	Compressive strength	Avg. Compressive strength
				Kg	mm^2	KN	N/mm^2	N/mm^2
1	16/12/17	06/01/18	28 days	8.568	22500	560	24.89	25.04
2	16/12/17	06/01/18	28 days	8.759	22500	560	24.89	
3	16/12/17	06/01/18	28 days	8.459	22500	570	25.33	

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Project	COMPREHENSIVE DEVELOPMENT FOR ROADS AND DRAINS IN WARD NO. 9, 10 AND 11 UNDER CMC AND TMC GRANTS, VIDYARANYAPURA SUB-DIVISION, YELAHANKA ZONE, BYATARAYANAPURA DIVISION.
Client	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	M/s Tejus Consultants
Contractor	M/S Ram and Company, Engineers & Contractors.

AGGREGATE IMPACT VALUE
(IS: 2386 Part - 4)

Proposed Use	WMM	**Date of Sampling**	**20/12/17**
Sample Location	**At plant**	**Date of Testing**	**20/12/17**

Sl. No.	**Description**		**Test No.**			**Spec Limit (%)**
			1	**2**	**3**	
1	Wt. of stone pieces (dry) passing IS Sieve 12.5mm but retained in IS sieve 10mm (gm)	(Wa)	382.00	379.00	374.00	
2	Wt. of the fraction retained in IS sieve 2.36mm after the impact test (gm)	(Wb)	295.00	298.00	285.00	
3	Wt. of the fraction passed in IS sieve 2.36mm after the impact test (gm)	(Wc)	87.00	81.00	89.00	
4	Aggregate Impact Value (%)	(Wc/Wa)*100	22.77	21.37	23.80	
5	Average Aggregate impact value	(%)	22.65			Max - 30 %

Remarks : Satisfactory / Not Satisfactory

Consultant's Representative

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Project	COMPREHENSIVE DEVELOPMENT FOR ROADS AND DRAINS IN WARD NO. 9, 10 AND 11 UNDER CMC AND TMC GRANTS, VIDYARANYAPURA SUB-DIVISION, YELAHANKA ZONE, BYATARAYANAPURA DIVISION.
Client	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	M/s Tejus Consultants
Contractor	M/S Ram and Company, Engineers & Contractors.

FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

Type of Material	WMM	Proposed Use	WMM
Sample Location	At plant	Date of Sampling	20/12/17
		Date of Testing	20/12/17

Size of aggregate		Flakiness Index		Elongation Index	
Passing through IS sieve, mm	Retained on IS sieve, mm	Total wt. of aggregate retained on sieves (A) gms.	Wt. of aggregate passing from Flakiness gauge (B) gms	Wt. of aggregate retained on Flakiness gauge (C) gms	Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	880	75	805	86
16.0	12.5	1156	150	1006	125
12.5	10.0	795	85	710	78
10.0	6.3	680	68	612	98
Total		3511	378	3133	387

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	10.77
Elongation Index(%):	12.35
Combined FI+EL (%)	23.12

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Consultant's Representative

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Project	COMPREHENSIVE DEVELOPMENT FOR ROADS AND DRAINS IN WARD NO. 9, 10 AND 11 UNDER CMC AND TMC GRANTS, VIDYARANYAPURA SUB-DIVISION, YELAHANKA ZONE, BYATARAYANAPURA DIVISION.
Client	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	M/s Tejus Consultants
Contractor	M/S Ram and Company, Engineers & Contractors.

FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

Type of Material	WMM	Proposed Use	WMM
Sample Location	At plant	Date of Sampling	20/12/17
		Date of Testing	20/12/17

Size of aggregate		Flakiness Index		Elongation Index	
Passing through IS sieve, mm	Retained on IS sieve, mm	Total wt. of aggregate retained on sieves (A) gms.	Wt. of aggregate passing from Flakiness gauge (B) gms	Wt. of aggregate retained on Flakiness gauge (C) gms	Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	920	65	855	90
16.0	12.5	1125	135	990	160
12.5	10.0	780	80	700	60
10.0	6.3	615	72	543	55
Total		3440	352	3088	365

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	10.23
Elongation Index(%):	11.82
Combined FI+EL (%)	22.05

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Consultant's Representative

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Name of Work	:	COMPREHENSIVE DEVELOPMENT FOR ROADS AND DRAINS IN WARD NO. 9, 10 AND 11 UNDER CMC AND TMC GRANTS, VIDYARANYAPURA SUB-DIVISION, YELAHANKA ZONE, BYATARAYANAPURA DIVISION.
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	M/S Ram and Company, Engineers & Contractors.
Date of Testing	:	20/12/17
Type of Mix	:	WMM
Sample I/D	:	WMM 1

GRADATION FOR WMM
(As per MORT&H 400-11)

Sample Location:	At plant	**Date of Sampling:**	20/12/17
		Date of testing:	20/12/17
Type of material & Purpose:	WMM	**Oven Dry Wt.(gms):**	10000.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	620	620	6.20	93.80	95-100
22.4	2512	3132	31.32	68.68	60-80
11.2	1758	4890	48.90	51.10	40-60
4.75	1358.0	6248	62.48	37.52	25-40
2.36	1358.0	7606	76.06	23.94	15-30
0.6	795.0	8401	84.01	15.99	8.0-22.0
0.075	840.0	9241	92.41	7.59	0-8
Pan	759.0				
Total	10000.0				

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Name of Work	:	COMPREHENSIVE DEVELOPMENT FOR ROADS AND DRAINS IN WARD NO. 9, 10 AND 11 UNDER CMC AND TMC GRANTS, VIDYARANYAPURA SUB-DIVISION, YELAHANKA ZONE, BYATARAYANAPURA DIVISION.
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	M/S Ram and Company, Engineers & Contractors.
Date of Testing	:	20/12/17
Type of Mix	:	WMM
Sample I/D	:	WMM 2

GRADATION FOR WMM
(As per MORT&H 400-11)

Sample Location:	At plant	Date of Sampling:	20/12/17
		Date of testing:	20/12/17
Type of material & Purpose:	WMM	Oven Dry Wt.(gms):	10000.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	358	358	3.58	96.42	95-100
22.4	2468	2826	28.26	71.74	60-80
11.2	2689	5515	55.15	44.85	40-60
4.75	1562.0	7077	70.77	29.23	25-40
2.36	986.0	8063	80.63	19.37	15-30
0.6	750.0	8813	88.13	11.87	8.0-22.0
0.075	670.0	9483	94.83	5.17	0-8
Pan	517.0				
Total	10000.0				

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Consultant's Representative

Name of Work	:	COMPREHENSIVE DEVELOPMENT FOR ROADS AND DRAINS IN WARD NO. 9, 10 AND 11 UNDER CMC AND TMC GRANTS, VIDYARANYAPURA SUB-DIVISION, YELAHANKA ZONE, BYATARAYANAPURA DIVISION.
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	M/S Ram and Company, Engineers & Contractors.
Date of Testing	:	20/12/17
Type of Mix	:	WMM
Sample I/D	:	WMM 3

GRADATION FOR WMM
(As per MORT&H 400-11)

Sample Location:	At plant	Date of Sampling:	20/12/17
		Date of testing:	20/12/17
Type of material & Purpose:	WMM	Oven Dry Wt.(gms):	10000.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	288	288	2.88	97.12	95-100
22.4	2469	2757	27.57	72.43	60-80
11.2	1759	4516	45.16	54.84	40-60
4.75	1678.0	6194	61.94	38.06	25-40
2.36	1268.0	7462	74.62	25.38	15-30
0.6	1235.0	8697	86.97	13.03	8.0-22.0
0.075	720.0	9417	94.17	5.83	0-8
Pan	583.0				
Total	10000.0				

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Consultant's Representative

TEJUS CONSULTANTS

Name of Work	:	COMPREHENSIVE DEVELOPMENT FOR ROADS AND DRAINS IN WARD NO. 9, 10 AND 11 UNDER CMC AND TMC GRANTS, VIDYARANYAPURA SUB-DIVISION, YELAHANKA ZONE, BYATARAYANAPURA DIVISION.
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	M/S Ram and Company, Engineers & Contractors.
Date of Testing	:	20/12/17
Type of Mix	:	WMM
Sample I/D	:	WMM 4

GRADATION FOR WMM
(As per MORT&H 400-11)

Sample Location:	At plant	Date of Sampling:	20/12/17
		Date of testing:	20/12/17
Type of material & Purpose:	WMM	Oven Dry Wt.(gms):	10000.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	318	318	3.18	96.82	95-100
22.4	2789	3107	31.07	68.93	60-80
11.2	2456	5563	55.63	44.37	40-60
4.75	1358.0	6921	69.21	30.79	25-40
2.36	1257.0	8178	81.78	18.22	15-30
0.6	795.0	8973	89.73	10.27	8.0-22.0
0.075	654.0	9627	96.27	3.73	0-8
Pan	373.0				
Total	10000.0				

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Consultant's Representative

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Project	**COMPREHENSIVE DEVELOPMENT FOR ROADS AND DRAINS IN WARD NO. 9, 10 AND 11 UNDER CMC AND TMC GRANTS, VIDYARANYAPURA SUB-DIVISION, YELAHANKA ZONE, BYATARAYANAPURA DIVISION.**	
Client	**BRUHAT BANGALORE MAHANAGARA PALIKE**	
Consultant	**M/s Tejus Consultants**	
Contractor	**M/S Ram and Company, Engineers & Contractors.**	
Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)		
	Date:	**21/12/17**
Layer no. or level	WMM I layer	
Depth of hole	250mm	
Field density:	1	2
Wt. of wet material from hole (Ww) gms.	6235	6125
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9712	9742
Wt. of sand in cone (w3) gms.	835	842
Wt. of sand in hole (w4)=(w1-w2-w3) gms.	3453	3416
Bulk density of sand (γs)gm/cc	1.31	1.32
Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc	2.37	2.37
Moisture meter reading(moisture content)	12.10	12.10
Result		
FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc	2.11	2.11
MDD	2.14	2.14
OMC	13.50%	13.50%
% compaction obtained	98.60	98.66
% compaction required	98%	98%

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Consultant's Representative

TEJUS CONSULTANTS

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CONSULTANTS

Project	**COMPREHENSIVE DEVELOPMENT FOR ROADS AND DRAINS IN WARD NO. 9, 10 AND 11 UNDER CMC AND TMC GRANTS, VIDYARANYAPURA SUB-DIVISION, YELAHANKA ZONE, BYATARAYANAPURA DIVISION.**	
Client	**BRUHAT BANGALORE MAHANAGARA PALIKE**	
Consultant	**M/s Tejus Consultants**	
Contractor	**M/S Ram and Company, Engineers & Contractors.**	
Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)		
	Date:	**21/12/17**
Layer no. or level	WMM I layer	
Depth of hole	250mm	
Field density:	1	2
Wt. of wet material from hole (Ww) gms.	6175	6256
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9715	9702
Wt. of sand in cone (w3) gms.	850	830
Wt. of sand in hole (w4)=(w1-w2-w3) gms.	3435	3468
Bulk density of sand (γs)gm/cc	1.32	1.31
Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc	2.37	2.36
Moisture meter reading(moisture content)	12.20	12.20
Result		
FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc	2.11	2.11
MDD	2.14	2.14
OMC	13.50%	13.50%
% compaction obtained	98.83	98.42
% compaction required	98%	98%

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Consultant's Representative

TEJUS CONSULTANTS

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Project	**COMPREHENSIVE DEVELOPMENT FOR ROADS AND DRAINS IN WARD NO. 9, 10 AND 11 UNDER CMC AND TMC GRANTS, VIDYARANYAPURA SUB-DIVISION, YELAHANKA ZONE, BYATARAYANAPURA DIVISION.**	
Client	**BRUHAT BANGALORE MAHANAGARA PALIKE**	
Consultant	**M/s Tejus Consultants**	
Contractor	**M/S Ram and Company, Engineers & Contractors.**	
Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)		
	Date:	**21/12/17**
Layer no. or level	WMM I layer	
Depth of hole	250mm	
Field density:	1	2
Wt. of wet material from hole (Ww) gms.	6250	6225
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9601	9668
Wt. of sand in cone (w3) gms.	850	850
Wt. of sand in hole (w4)=(w1-w2-w3) gms.	3549	3482
Bulk density of sand (γs)gm/cc	1.34	1.32
Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc	2.36	2.36
Moisture meter reading(moisture content)	12.10	12.10
Result		
FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc	2.11	2.11
MDD	2.14	2.14
OMC	13.50%	13.50%
% compaction obtained	98.37	98.37
% compaction required	98%	98%

AE-9

Consultant's Representative

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Project	COMPREHENSIVE DEVELOPMENT FOR ROADS AND DRAINS IN WARD NO. 9, 10 AND 11 UNDER CMC AND TMC GRANTS, VIDYARANYAPURA SUB-DIVISION, YELAHANKA ZONE, BYATARAYANAPURA DIVISION.
Client	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	M/s Tejus Consultants
Contractor	M/S Ram and Company, Engineers & Contractors.

AGGREGATE IMPACT VALUE
(IS: 2386 Part - 4)

Proposed Use	WMM	**Date of Sampling**	**22/12/17**
Sample Location	**At plant**	**Date of Testing**	**22/12/17**

Sl. No.	Description		Test No. 1	Test No. 2	Test No. 3	Spec Limit (%)
1	Wt. of stone pieces (dry) passing IS Sieve 12.5mm but retained in IS sieve 10mm (gm)	(Wa)	398.00	388.00	384.00	
2	Wt. of the fraction retained in IS sieve 2.36mm after the impact test (gm)	(Wb)	310.00	301.00	295.00	
3	Wt. of the fraction passed in IS sieve 2.36mm after the impact test (gm)	(Wc)	88.00	87.00	89.00	
4	Aggregate Impact Value (%)	(Wc/Wa)*100	22.11	22.42	23.18	
5	Average Aggregate impact value	(%)	22.57			Max - 30 %

Remarks : Satisfactory / Not Satisfactory

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Project	COMPREHENSIVE DEVELOPMENT FOR ROADS AND DRAINS IN WARD NO. 9, 10 AND 11 UNDER CMC AND TMC GRANTS, VIDYARANYAPURA SUB-DIVISION, YELAHANKA ZONE, BYATARAYANAPURA DIVISION.
Client	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	M/s Tejus Consultants
Contractor	M/S Ram and Company, Engineers & Contractors.

FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

Type of Material	WMM	Proposed Use	WMM
Sample Location	At plant	Date of Sampling	22/12/17
		Date of Testing	22/12/17

Size of aggregate		Flakiness Index		Elongation Index	
Passing through IS sieve, mm	Retained on IS sieve, mm	Total wt. of aggregate retained on sieves (A) gms.	Wt. of aggregate passing from Flakiness gauge (B) gms	Wt. of aggregate retained on Flakiness gauge (C) gms	Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	865	68	797	80
16.0	12.5	1356	145	1211	132
12.5	10.0	748	88	660	95
10.0	6.3	635	78	557	68
Total		**3604**	**379**	**3225**	**375**

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	10.52
Elongation Index(%):	11.63
Combined FI+EL (%)	22.14

AE-9

Consultant's Representative

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Project	**COMPREHENSIVE DEVELOPMENT FOR ROADS AND DRAINS IN WARD NO. 9, 10 AND 11 UNDER CMC AND TMC GRANTS, VIDYARANYAPURA SUB-DIVISION, YELAHANKA ZONE, BYATARAYANAPURA DIVISION.**
Client	**BRUHAT BANGALORE MAHANAGARA PALIKE**
Consultant	**M/s Tejus Consultants**
Contractor	**M/S Ram and Company, Engineers & Contractors.**

FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

Type of Material	WMM	**Proposed Use**	**WMM**
Sample Location	At plant	**Date of Sampling**	**22/12/17**
		Date of Testing	**22/12/17**

Size of aggregate		**Flakiness Index**		**Elongation Index**	
Passing through IS sieve, mm	**Retained on IS sieve, mm**	**Total wt. of aggregate retained on sieves (A) gms.**	**Wt. of aggregate passing from Flakiness gauge (B) gms**	**Wt. of aggregate retained on Flakiness gauge (C) gms**	**Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms**
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	890	72	818	60
16.0	12.5	1154	165	989	120
12.5	10.0	702	72	630	85
10.0	6.3	610	65	545	65
Total		**3356**	**374**	**2982**	**330**

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	11.14
Elongation Index(%):	11.07
Combined FI+EL (%)	22.21

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Name of Work	:	COMPREHENSIVE DEVELOPMENT FOR ROADS AND DRAINS IN WARD NO. 9, 10 AND 11 UNDER CMC AND TMC GRANTS, VIDYARANYAPURA SUB-DIVISION, YELAHANKA ZONE, BYATARAYANAPURA DIVISION.
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	M/S Ram and Company, Engineers & Contractors.
Date of Testing	:	22/12/17
Type of Mix	:	WMM
Sample I/D	:	WMM 1

GRADATION FOR WMM
(As per MORT&H 400-11)

Sample Location:	At plant	Date of Sampling:	22/12/17
		Date of testing:	22/12/17
Type of material & Purpose:	WMM	Oven Dry Wt.(gms):	10000.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	326	326	3.26	96.74	95-100
22.4	2478	2804	28.04	71.96	60-80
11.2	2687	5491	54.91	45.09	40-60
4.75	1025.0	6516	65.16	34.84	25-40
2.36	1358.0	7874	78.74	21.26	15-30
0.6	952.0	8826	88.26	11.74	8.0-22.0
0.075	720.0	9546	95.46	4.54	0-8
Pan	454.0				
Total	10000.0				

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Name of Work	:	COMPREHENSIVE DEVELOPMENT FOR ROADS AND DRAINS IN WARD NO. 9, 10 AND 11 UNDER CMC AND TMC GRANTS, VIDYARANYAPURA SUB-DIVISION, YELAHANKA ZONE, BYATARAYANAPURA DIVISION.
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	M/S Ram and Company, Engineers & Contractors.
Date of Testing	:	22/12/17
Type of Mix	:	WMM
Sample I/D	:	WMM 2

GRADATION FOR WMM
(As per MORT&H 400-11)

Sample Location:	At plant	Date of Sampling:	22/12/17
		Date of testing:	22/12/17
Type of material & Purpose:	WMM	Oven Dry Wt.(gms):	10000.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	356	356	3.56	96.44	95-100
22.4	2317	2673	26.73	73.27	60-80
11.2	2720	5393	53.93	46.07	40-60
4.75	1156.0	6549	65.49	34.51	25-40
2.36	1428.0	7977	79.77	20.23	15-30
0.6	895.0	8872	88.72	11.28	8.0-22.0
0.075	743.0	9615	96.15	3.85	0-8
Pan	385.0				
Total	10000.0				

Consultant's Representative

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No. 58, 3rd main, 6th Cross, 1st Stage KHB Colony, Basaveshwaranagar, Bangalore - 560079, O : +91 80 23287532, tejusconsultants@gmail.com

Name of Work	:	COMPREHENSIVE DEVELOPMENT FOR ROADS AND DRAINS IN WARD NO. 9, 10 AND 11 UNDER CMC AND TMC GRANTS, VIDYARANYAPURA SUB-DIVISION, YELAHANKA ZONE, BYATARAYANAPURA DIVISION.
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	M/S Ram and Company, Engineers & Contractors.
Date of Testing	:	22/12/17
Type of Mix	:	WMM
Sample I/D	:	WMM 3

GRADATION FOR WMM
(As per MORT&H 400-11)

Sample Location:	At plant	**Date of Sampling:**	22/12/17
		Date of testing:	22/12/17
Type of material & Purpose:	WMM	**Oven Dry Wt.(gms):**	10000.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	340	340	3.40	96.60	95-100
22.4	2145	2485	24.85	75.15	60-80
11.2	2658	5143	51.43	48.57	40-60
4.75	1125.0	6268	62.68	37.32	25-40
2.36	1214.0	7482	74.82	25.18	15-30
0.6	956.0	8438	84.38	15.62	8.0-22.0
0.075	915.0	9353	93.53	6.47	0-8
Pan	647.0				
Total	10000.0				

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Name of Work	:	COMPREHENSIVE DEVELOPMENT FOR ROADS AND DRAINS IN WARD NO. 9, 10 AND 11 UNDER CMC AND TMC GRANTS, VIDYARANYAPURA SUB-DIVISION, YELAHANKA ZONE, BYATARAYANAPURA DIVISION.
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	M/S Ram and Company, Engineers & Contractors.
Date of Testing	:	22/12/17
Type of Mix	:	WMM
Sample I/D	:	WMM 4

GRADATION FOR WMM
(As per MORT&H 400-11)

Sample Location:	At plant	**Date of Sampling:**	22/12/17
		Date of testing:	22/12/17
Type of material & Purpose:	WMM	**Oven Dry Wt.(gms):**	10000.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	285	285	2.85	97.15	95-100
22.4	2156	2441	24.41	75.59	60-80
11.2	1789	4230	42.30	57.70	40-60
4.75	1896.0	6126	61.26	38.74	25-40
2.36	1689.0	7815	78.15	21.85	15-30
0.6	680.0	8495	84.95	15.05	8.0-22.0
0.075	880.0	9375	93.75	6.25	0-8
Pan	625.0				
Total	10000.0				

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